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Environmental Product Declarations and Product Category Rules

Amy A. Costello, LEED-AP, LCACP
Rita Schenck, PhD, LCACP
October 26, 2009

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Rita Schenck

- Founder & Director of IERE
- NGO that Supports Fact-based Environmental Decision-Making
- Home of the American Center for Life Cycle Assessment (ACLCA)

This session will cover

Environmental Product Declarations (EPDs)

Product Category Rules (PCRs)

- Where they are from
- How they are written
- How they are verified

- The current and pending PCR standards globally
- Existing and planned EPD programs
- What is new? Meeting 4-5 November

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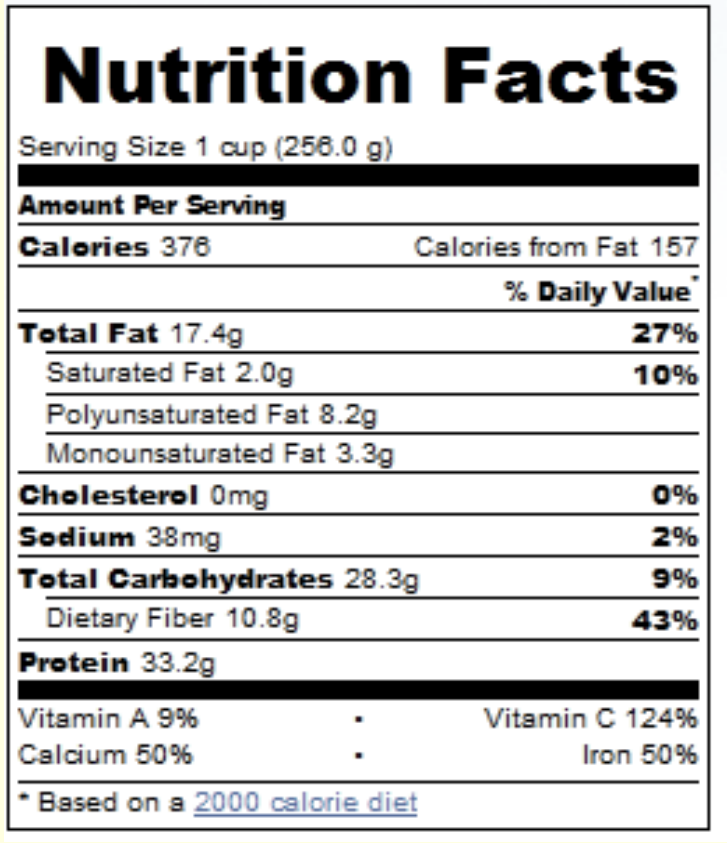
Environmental Product Declarations

- A label that discloses the life cycle environmental performance of products and services
- NOT a claim of environmental superiority
- Also Know As:
  - Type III Environmental Declarations
  - Type III Ecolabels



Nutrition Facts

Serving Size 1 cup (256.0 g)

Amount Per Serving	
Calories 376	Calories from Fat 157
	% Daily Value*
Total Fat 17.4g	**27%**
Saturated Fat 2.0g	**10%**
Polyunsaturated Fat 8.2g	
Monounsaturated Fat 3.3g	
Cholesterol 0mg	**0%**
Sodium 38mg	**2%**
Total Carbohydrates 28.3g	**9%**
Dietary Fiber 10.8g	**43%**
Protein 33.2g	

Vitamin A 9% • Vitamin C 124%

Calcium 50% • Iron 50%

* Based on a 2000 calorie diet

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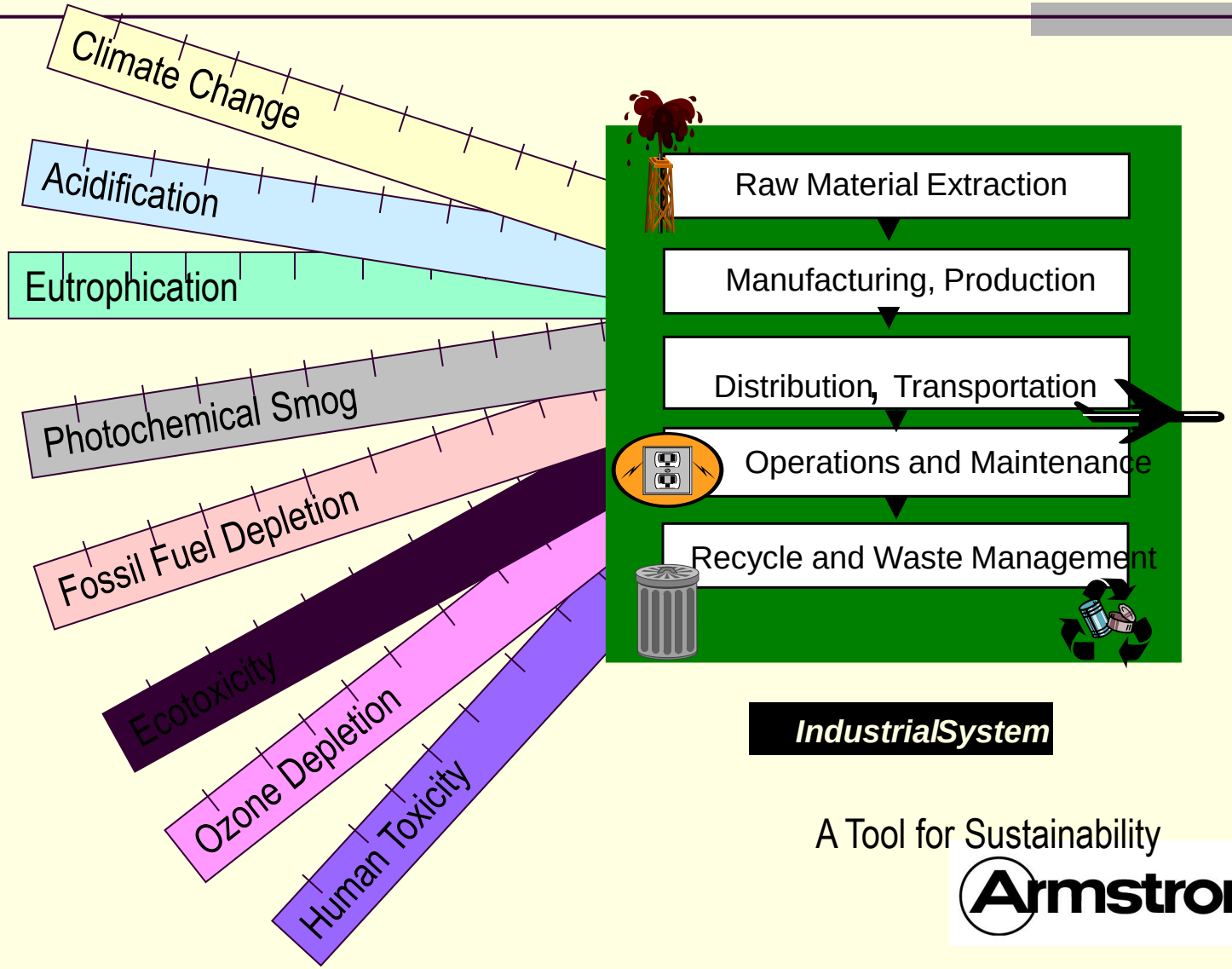
Life Cycle Assessment: The Holistic Yardstick of Environmental Performance



A Tool for Sustainability

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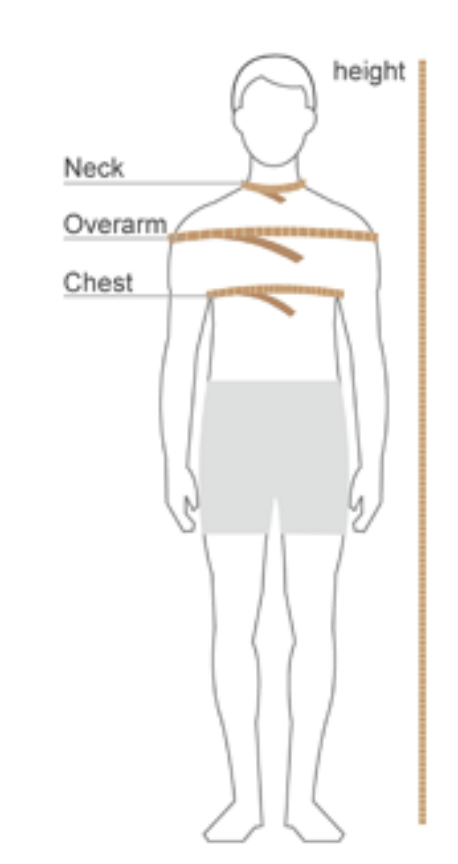
Scoping: how and what we measure



- Height ?
- Circumference?
- Shirt size?
- Centimeters?

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EPD Content Options

A. Life cycle impact results, *or*
B. Life cycle inventory results (e.g., grams of copper)
C. Perhaps other non-LCA results , e.g.
   - Energy or waste figures or recycled content
   - Chlorine free or other “frees”
D. Possibly a logo

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Suggested Impacts Covered

- climate change (carbon footprint),
- depletion of the stratospheric ozone layer,
- acidification of land and water sources,
- eutrophication,
- formation of photochemical oxidants,
- depletion of fossil energy resources, and
- depletion of mineral resources.

Suggested list in ISO 14025

This means we can directly calculate the environmental impacts of a business, product, building

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Other Things to Know About the Environmental Product Declaration

- Owned by the product or brand owner
- Backed up with LCA Studies based on PCRs
- Discloses *quantified* life cycle data for the product.
- Must clearly state the life cycle stages and product component it covers, the validity over which the label can function.
- Must provide contact information for the program owner and the validator.

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Steelcase

Environmental Product Declaration

A presentation of quantified environmental life cycle product information for the **Think** work chair in North America.

Think

	Category	Unit	Total	Materials	Production	Transport	End of Life
	Global warming	[g CO_2-eq.]	102 610.0	67 800.0	27 700.0	3 720.0	3 390.0
	Acidification	[g SO_2-eq.]	836.6	535.0	266.0	35.3	0.3
	Eutrophication	[g NO_3-eq.]	712.2	471.0	179.0	59.2	3.0
	Photochemical smog	[g C_2H_4-eq.]	24.2	18.0	0.8	4.6	0.7

Part of a 5-page document

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Methyl Ethyl Hydroxy Ethyl Cellulose

Owner

LCIA Results

Emissions, expressed in terms of environmental impact		
Category of impact	**Equivalent unit**	**Impact**
Global warming potential (GWP)	g CO_2	3 200 000
Ozone depletion potential (ODP)	g CFC-11	9
Acidification potential (AP)	mole H^+	720
Photochemical ozone creation potential (POCP)	g ethene	2700
Eutrophication potential (EP)	g O_2	260 000
An explanation to these impact categories is found at the end of this EPD.		

Part of the 4-page document

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Inventory Information

Non-renewable resources			
Without energy content	**kg**	**With energy content**	**MJ**
Sodium chloride	1 300	Natural gas	34 000
Limestone	40	Nuclear energy	21 000

This table displays the total us feedstock, needed for 1000 kg

Renewable resources			
Without energy content	**kg**	**With energy content**	**MJ**
–	–	Biomass	38 000
		Wood	8 000

The Wood resource represent
Biomass represents the total

Electricity net consumption	
Electricity production source	**kWh**
Unspecified	2 600
Nuclear power	1 300
Hydro power	1 200
Natural gas	100
Coal	100
Bio fuel	100

Unspecified means that the electricity grid is not known and is represented by a mix of electricity production sources.

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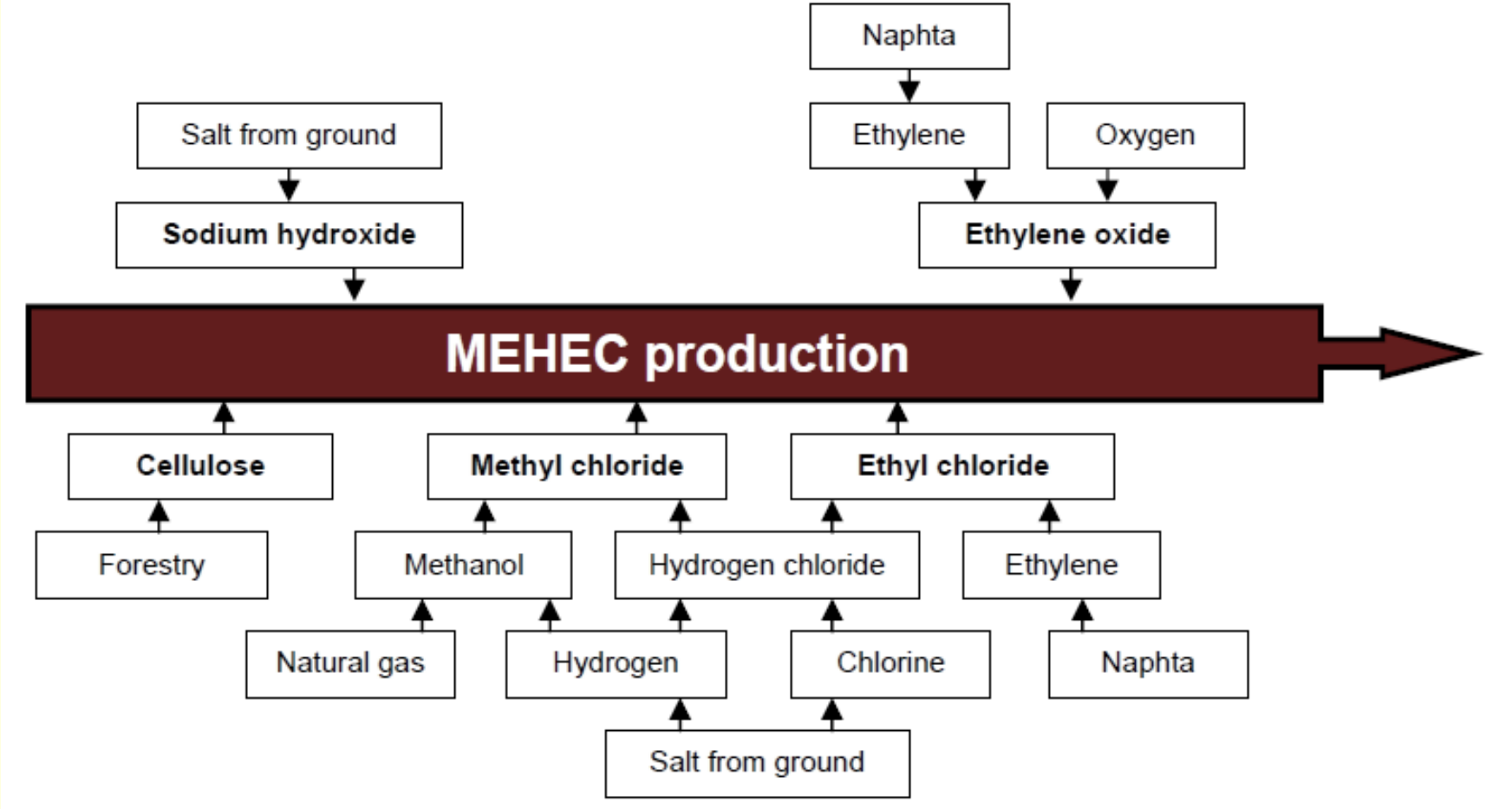

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Direct Print Laminate Flooring

What is covered

Direct print laminate flooring				
Evaluation variable	**Unit per m²**	**Total**	**Manufacturing**	**End of Life**
Primary energy, non renewable	[MJ]	46.0	104	-57.8
Primary energy, renewable	[MJ]	130	131	-0.94
Global warming potential (GWP 100 years)	[kg CO_2 eqv.]	0.67	-5.40	6.06
Ozone depletion potential (ODP)	[kg R11 eqv.]	2.47E-07	4.45E-07	-1.98E-07
Acidification potential (AP)	[kg SO_2 eqv.]	0.036	0.022	0.014
Eutrophication potential (EP)	[kg Phosphate eqv.]	0.0084	0.0054	0.0030
Photochemical oxidant formation tential (POCP)	[kg Ethylene eqv.]	0.0086	0.0082	0.00042

Environmental Product Declaration

according to ISO 14025

EGGER
Direct Print (DPR®)
Laminate flooring

Declaration number
EPD-EHW-2008221-E

Institut Bauen und Umwelt e.V.
www.bau-umwelt.com

Institut Bauen
und Umwelt e.V.

Summary
Umwelt-Produktdeklaration
Environmental Product-Declaration

Institut Bauen und Umwelt e.V. www.bau-umwelt.com	Program holder
EGGER Floor Products GmbH Im Kissen 19 D – 59929 Brilon	Declaration holder
EPD-EHW-2008221-E	Declaration number
Egger Floor Products Direct Print Flooring - DPR® This declaration is an environmental product declaration according to ISO 14025 and describes the environmental rating of the building products listed herein. It is intended to further the development of environmentally compatible and sustainable construction methods. All relevant environmental data is disclosed in this validated declaration. The declaration is based on the PCR document "Wood-based materials amended", year 2007.	Declared building products
This validated declaration authorises the holder to bear the official stamp of the Institut Bauen und Umwelt. It only applies to the listed products for three years from the date of issue. The declaration holder is liable for the information and evidence on which the declaration is based.	Validity
The declaration is complete and contains in its full form: - Product definition and physical building-related data - details of raw materials and material origin - description of how the product is manufactured - instructions on how to process the product - data on usage condition, unusual effects and end of life phase - life cycle analysis results - evidence and tests	Content of the declaration
8. April 2008	Date of issue
Prof. Dr.-Ing. Horst J. Bossenmayer (President of the Institut Bauen und Umwelt)	Signatures
This declaration and the rules on which it is based have been examined by an independent expert committee (SVA) in accordance with ISO 14025.	Verification of the declaration
Prof. Dr.-Ing. Hans-Wolf Reinhardt (chairman of the expert committee) / Dr. Frank Werner (tester appointed by the expert committee)	Signatures

Summary

Umwelt-Produktdeklaration

Environmental Product-Declaration

Direct print flooring is made from decorative hard surface flooring elements with a highly abrasion-resistant surface, which are installed as floating floor without glue using a click connection and are described as laminate flooring according to DIN 15468. The decorative design is printed directly onto the primed coreboard using a pressure cylinder. Corundum is added to the uppermost layer in order to achieve a highly abrasion-resistant surface.	Product description
The applications for the declared direct print laminate flooring are: Interior areas; laid as floating floor either on concrete or other existing subfloor such as wood, tile, PVC, etc. A skilled end user can install the flooring themselves. Due to the low panel thickness the flooring can also be used for renovating.	Application
The Life Cycle Assessment (LCA) was performed according to DIN ISO 14040 following the requirements of the Institut Bauen und Umwelt guideline for type III declarations. Both specific data from the reviewed products and data from the "GaBi 4" database were used. The life cycle assessment encompasses the raw material and energy production, raw material transport, the actual manufacturing phase and the end of life as waste incineration with energy recovery. The direct print laminate flooring product mix is declared.	Scope of the LCA
	Results of the LCA
Prepared by: PE INTERNATIONAL, Leinfelden-Echterdingen, in cooperation with EGGER Floor Products GmbH, Brilon	
In addition, the results of the following tests are shown in the environmental product declaration: • VOC emissions according to AgBB (German operational fire protection working committee) method Testing institute: eph Entwicklungs- und Prüflabor Holztechnologie GmbH Dresden • Formaldehyde: Testing institute: WKI Fraunhofer Wilhelm-Klauditz-Institut • Toxicity of the fire gases: Testing institute: MPPA Leipzig GmbH • PCP / lindane Testing institute: WKI Fraunhofer Wilhelm-Klauditz-Institut • EOX (extractable organic halogen compounds) Testing institute: MPPA Leipzig GmbH • Eluate analysis according to DIN 38406-4 Testing institute: MPPA Leipzig GmbH	Evidence and verifications

Direct print laminate flooring

Evaluation variable	Unit per m²	Total	Manufacturing	End of Life
Primary energy, non renewable	[MJ]	46.0	104	-57.8
Primary energy, renewable	[MJ]	130	131	-0.94
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Acidification potential (AP)	[kg SO_2-eqv.]	0.036	0.022	0.014
Eutrophication potential (EP)	[kg Phosphate eqv.]	0.0064	0.0054	0.0009
Photochemical oxidant formation potential (POCP)	[kg Ethylene eqv.]	0.0099	0.0062	0.00042

Institut Bauen und Umwelt e.V.

Publisher:
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(formerly Arbeitsgemeinschaft Umweltverträgliches Bauprodukt e.V., AUB)
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Layout:
PE INTERNATIONAL GmbH

Illustration credits:
EGGER Floor Products GmbH

EGGER Floor Products GmbH
Im Kissen 19
D – 59929 Brilon

In the case of a doubt the original EPD "EPD-EHW-2008221-D" applicable.

Program Operator

Contact Information

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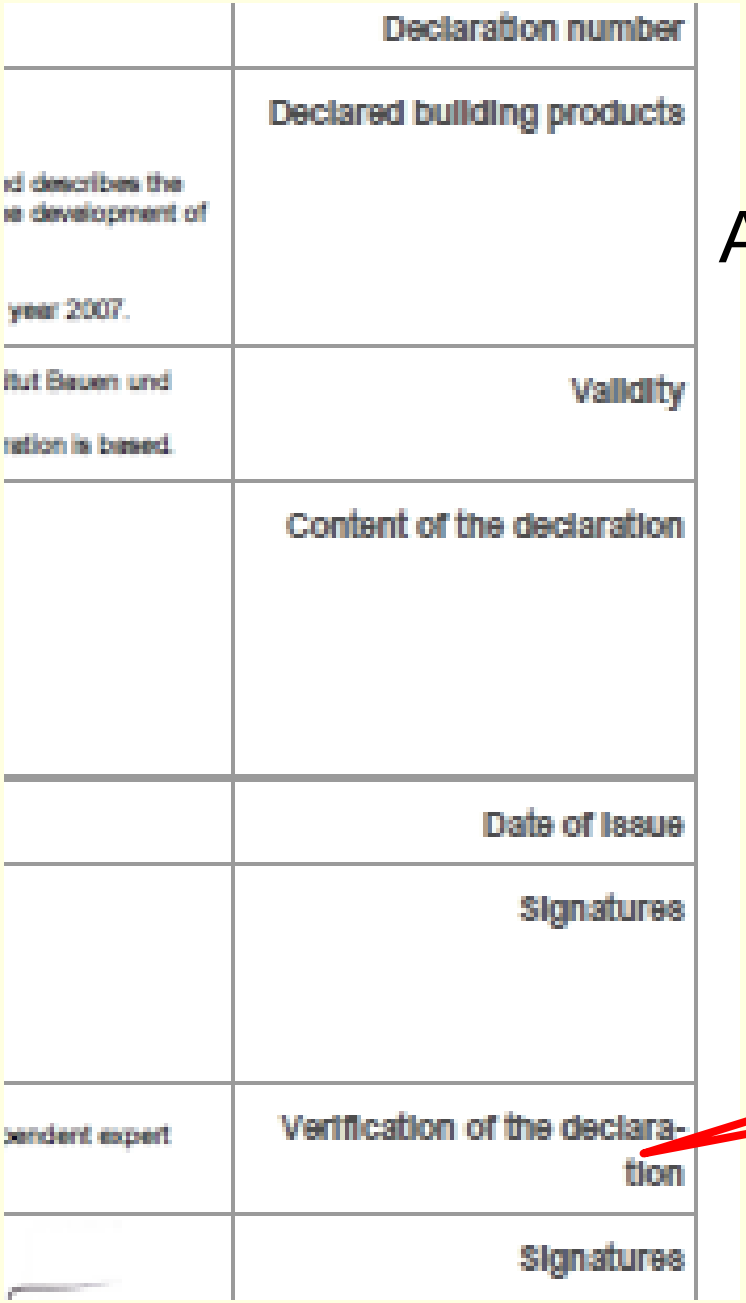
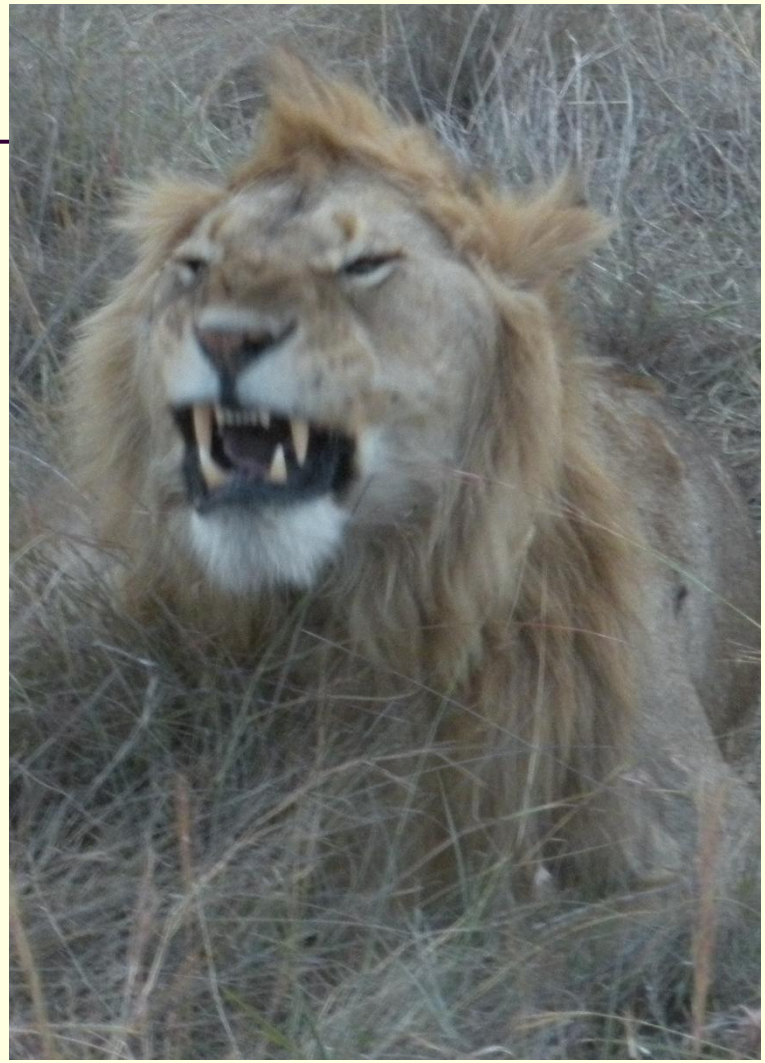


Although the EPD is compact it covers all the areas required by the standard

Including Verification

Verifiers

- Independent
  - Uninvolved with work
  - No conflict of interest
- Competent
  - LCAs & EPDs
  - Standards & regulations
  - Product



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Verification of EPD

- Conformance with the PCR & PCR Program;
- Conformance with the ISO 14040 series of standards;
- that data evaluation is comprehensive and complete
- Completeness and Accuracy of
  - The LCA data;
  - The additional environmental information;
  - The supporting information.

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International Standards that Apply

- ISO 14020 (Environmental Labeling)
- ISO 14025 (Type III Environmental declarations)
- ISO 21930 (EPDs for buildings)
- ISO ISO/TC 207/SC 3 N284 Guidelines for Making and Assessing Environmental Claims

- ASTM- international standardization underway
- EU CEN Standardization underway

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National Standards that Apply

Mandatory

- In The U.S. Part 260 Guides for the Use of Environmental Market Claims (Federal Trade Commission)
- In Canada, voluntary guidance per “Plus 14021”

Mandatory

- France has AFNOR standards under le *Grenelle Environnment*
- PAS 2050 Carbon footprinting (British Standards Institute)
- And so forth…

- Standardization effort underway at the Leonardo Academy

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Questions?

Amy Costello

- Senior Environmental Scientist, Armstrong World Industries
- Leading PCR standards development within ASTM International

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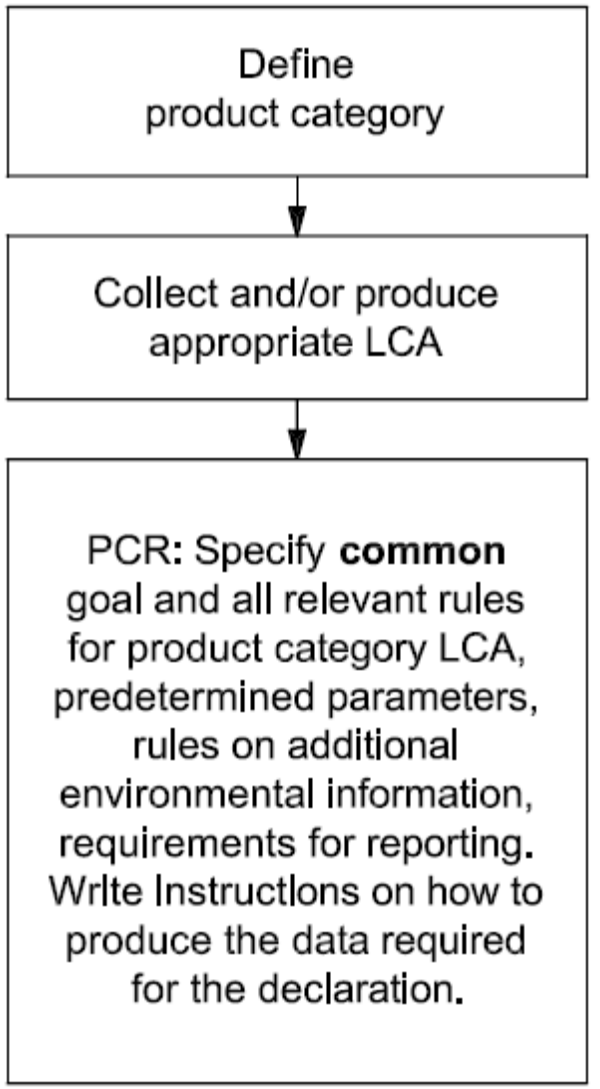
What are Product Category Rules?

Product Category Rules:

⇨ Set of specific rules, requirements and guidelines for developing Type III environmental declarations (EPD) for one or more product categories.

Product Category:

⇨ Group of products that can fulfill equivalent functions



Source: ISO 14025 (2006)
ISO 21930 (2007)

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Why Product Category Rules?

Comparability

Modularity

Transparency

Flexibility

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Comparability

- Allows environmental performance of products to be compared on a life cycle basis
- Information must be transparent to allow understanding of limitations of comparability

Limits:

- Based on same PCRs
- Based on all life cycle stages

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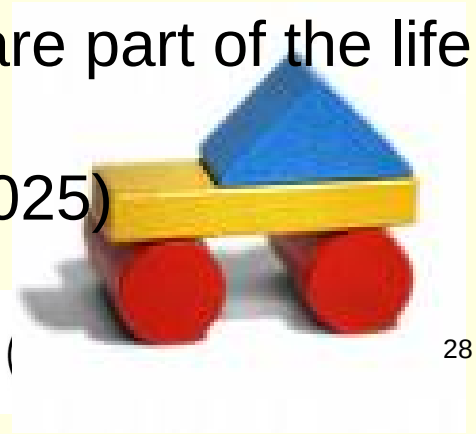
Modularity

- LCA based data
- For materials, parts and other inputs
- Used in the manufacture/assembly of other products

Information Modules

- Compilation of data
- Basis for an EPD covering a unit process or a combination of unit processes that are part of the life cycle of a product
- Should cover all life stages (ISO 14025)
- May be a Type III EPD



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Transparency

- General Program Instructions
- A list of all published PCR documents within the program
- PCR documents
- Involvement of interested parties
- "Open" consultation recommended

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Flexibility

- Allows a range of different types of bodies to operate a Type III EPD programs
- Use of relevant stages of the life cycle, with documentation
- Allows for additional information

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Product Category Rules

- Created by the Program Operator
- A separate PCR for each functional unit
- Contains all the scoping required by an LCA
- Also scoping of EPD-specific issues such as:
  - The format of the label
  - Information about the program and the verifier

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What does the program operator do?

- Develops a management program to produce EPDs
- Specifies rules and criteria for verifying PCRs/EPDs
- Assures Program:
  - Includes interested parties in development of the program and PCRs
  - Is transparent, available, kept current and adhered to
  - Follows all the relevant ISO standards
- Operator may or may not do EPD studies

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Program Operators

- Can be any organization or group of organizations
- Examples:
  - *EPD Network* *(EU, mostly Sweden)
  - Japanese Ecoleaf
  - IBU – Germany
  - Eco-Product Institute – Korea
  - IERE *Earthsure*

EPD®

Institut Bauen und Umwelt e.V.

KOECO
Korea Eco-Products Institute

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* United Nation's Classification Registry CPC codes

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How is information Shared?

- Up to the Program Operators
- Swedish & Germany Systems have MOU and share PCRs
- EPD (Sweden) – Allows all PCR to be posted to their website
- GEDnet – Global network that foster cooperation and information exchange among program operators (www.gednet.org)

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What is included in PCR ?

- Product Category Definition
- Goal and Scope definition for the product LCA
  - Functional unit
  - Declared unit
  - System boundary
  - Description of data
  - Units
  - Criteria for the inclusion of inputs and outputs

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What is included in PCR ?

- Inventory Analysis – data collection & allocation
- Impact category selection and calculation rules
- Additional environmental information
- Materials and substances for declaration
- Period of validity

How to develop PCRs?

- Gather previous PCRs and LCAs on the topic
- Get interested parties together
  - Manufacturer
  - Trade Association
  - Competitors
  - Material suppliers
  - NGOs
  - Others

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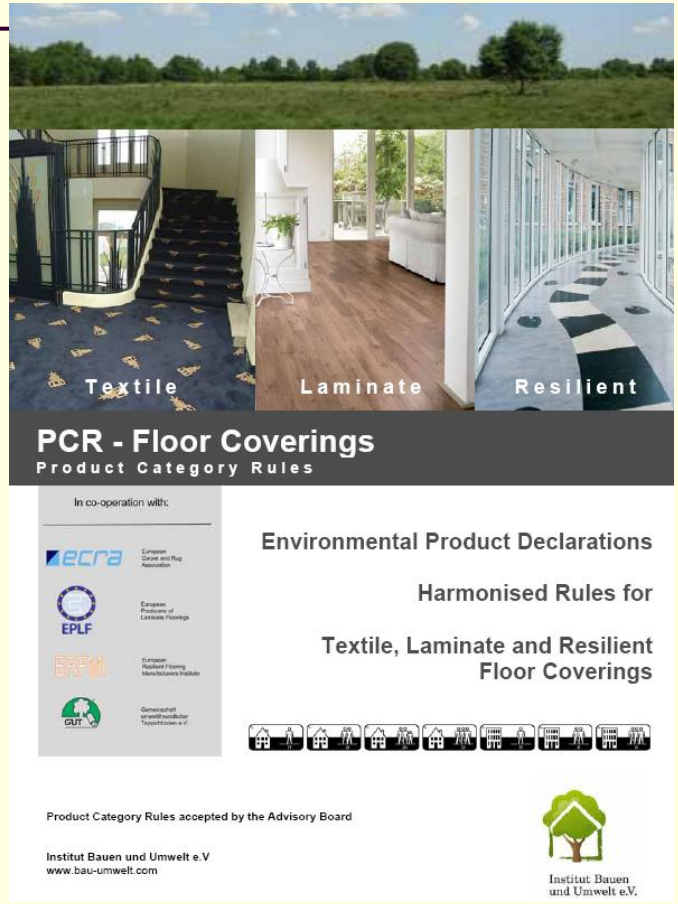
How to develop PCRs?

- Identify the system function and functional unit
- If necessary develop the LCA
- Write the PCR based on existing LCA(s)
- Have a panel review the PCR



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Levels of Verification

- General - Type III Program
  - Independently verified – internally or externally
  - ISO 14020 and 14040 series
- PCR Review
  - Third-party reviewed
- Data (LCA, LCI) Verification
  - Independently verified
- Type III EPD
  - Independent verified - Business to business
  - Third Party – Business to consumer

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What are the verification procedures?

PCR Review:

- Third-party Panel: chair and two members
- Demonstrates:
  - PCR compliance with ISO 14040
  - PCR give a description of the environmental aspects of a product
- Review and responses must be included in PCR documentation

Summary
Environmental Product-Declaration

Program operator
Institut Bauen und Umwelt e.V.
www.bau-umwelt.com

Declaration holder
EPLF®
European Producers of Laminate Flooring e.V.
Mittelstr. 50
33602 Bielefeld
Germany

Declaration number
EPD-ELF-2009111-E

Declared building product
Direct Pressure Laminate Floor Covering (DPL Floor Covering)
This declaration is an environmental product declaration according to ISO 14025 describing the environmental performances of the construction products mentioned. It shall promote the development of the sustainable and health-friendly building. In this validated declaration, all relevant environmental data are disclosed. The declaration is based on the PCR document "floor coverings", year 2006-01.

Validity
This validated declaration authorises the use of the label of Institut Bauen und Umwelt. It exclusively applies for the products mentioned, three years from date of issue. The holder of the declaration is liable for underlying data and supporting documents.

Content of declaration
The declaration is complete and furnishes details of:
- product definition and relevant building-physics-related information
- raw materials and origin of the raw materials
- descriptions of the product manufacture
- information on product processing
- information on the use stage, extraordinary influences and end-of-life stage
- results of the life cycle assessment

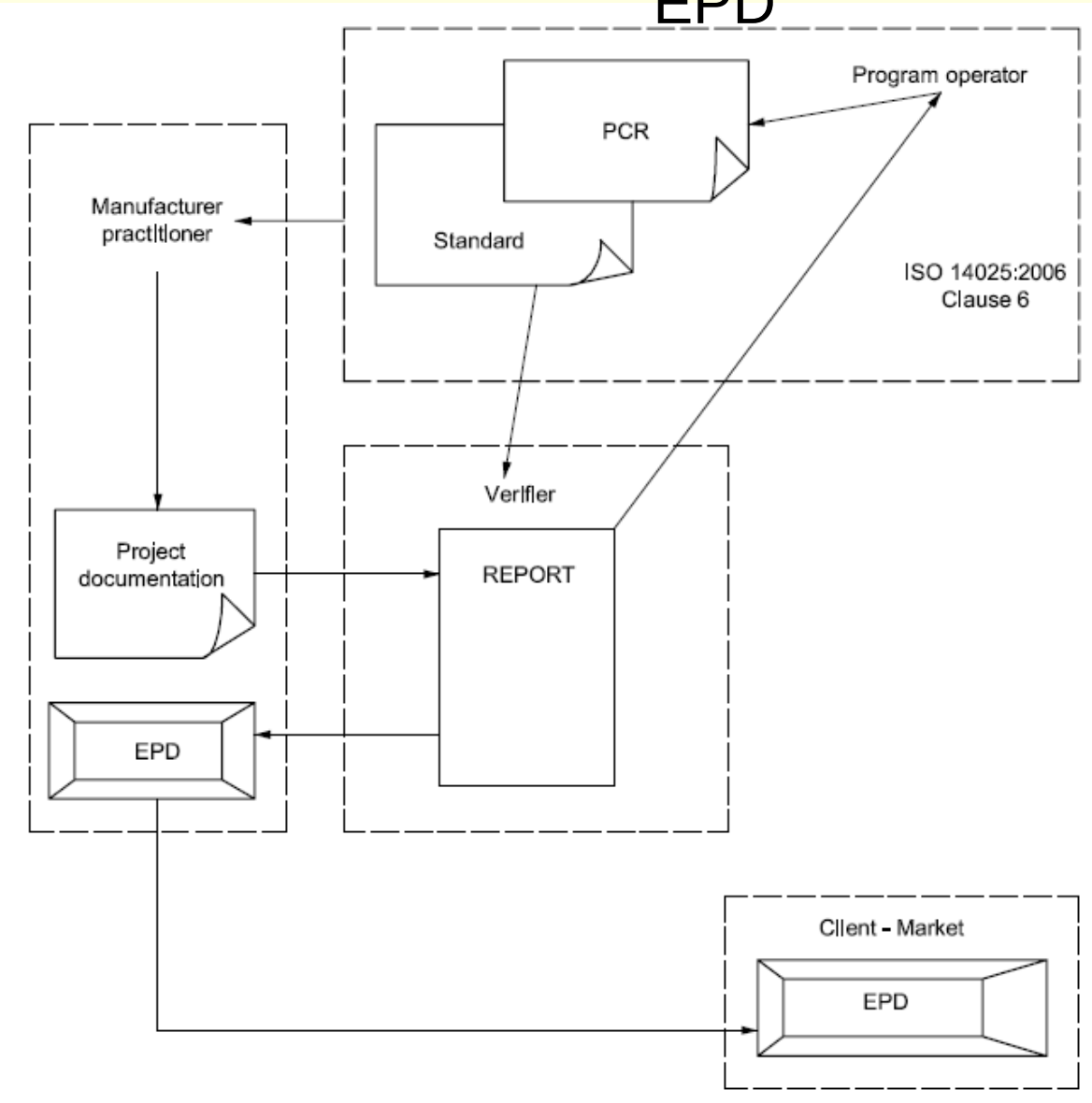
Date of issue
11. August 2009

Signatures
Prof. Dr.-Ing. Horst J. Bossenmayer (President of IBU)

Verification of the declaration
This declaration was independently verified by the advisory board (SVA), according to ISO 14025.

Signatures
Prof. Dr.-Ing. Hans-Wolf Reinhardt (Chairman of the SVA)
Dr. Eva Schmincke (Verifier appointed by SVA)

The sequence of documents from the PCR document to the EPD

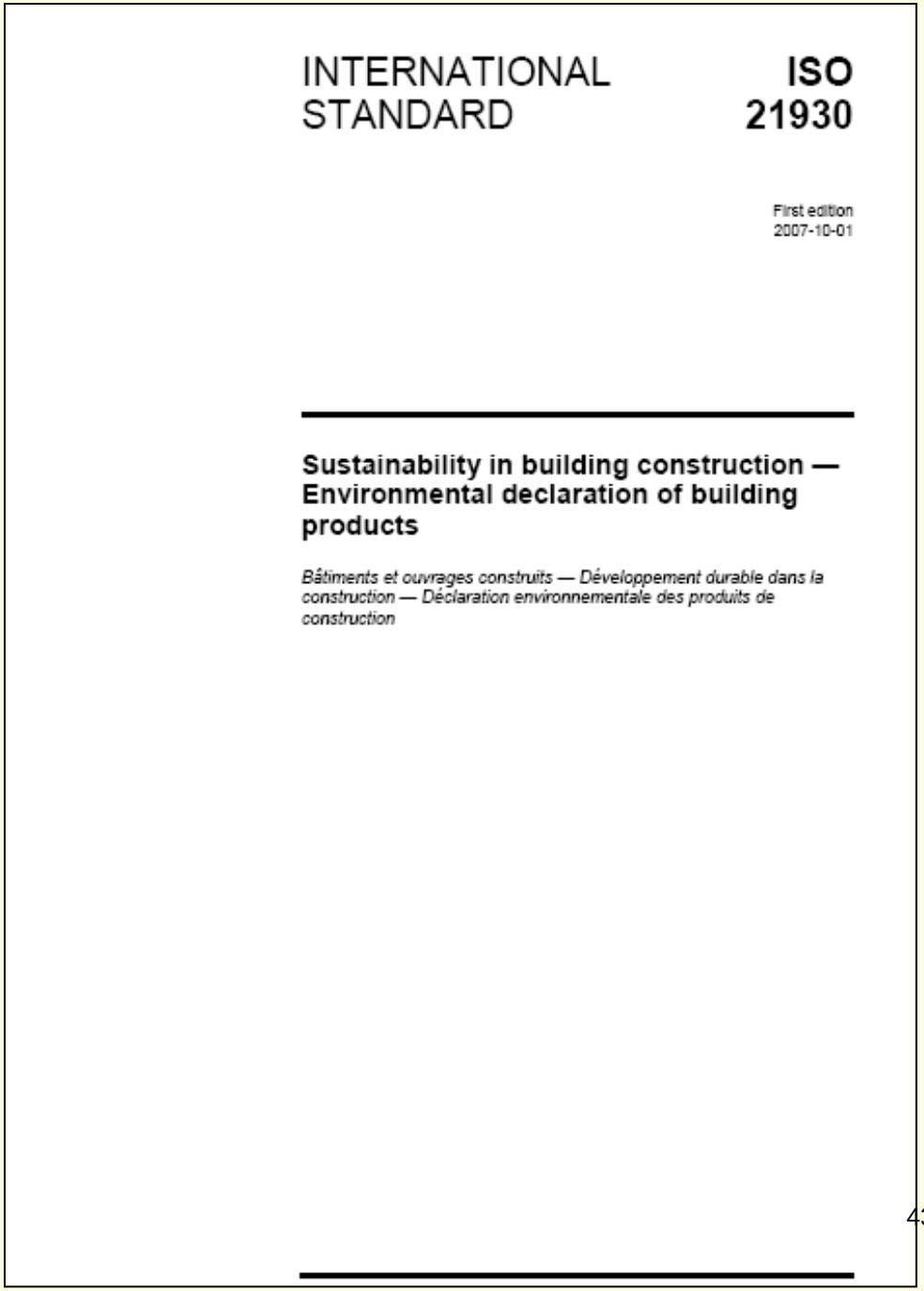


Questions?

ISO 21930 Sustainability in building construction

—

Environmental declaration of building products



INTERNATIONAL STANDARD

ISO 21930

First edition
2007-10-01

Sustainability in building construction — Environmental declaration of building products

Bâtiments et ouvrages construits — Développement durable dans la construction — Déclaration environnementale des produits de construction

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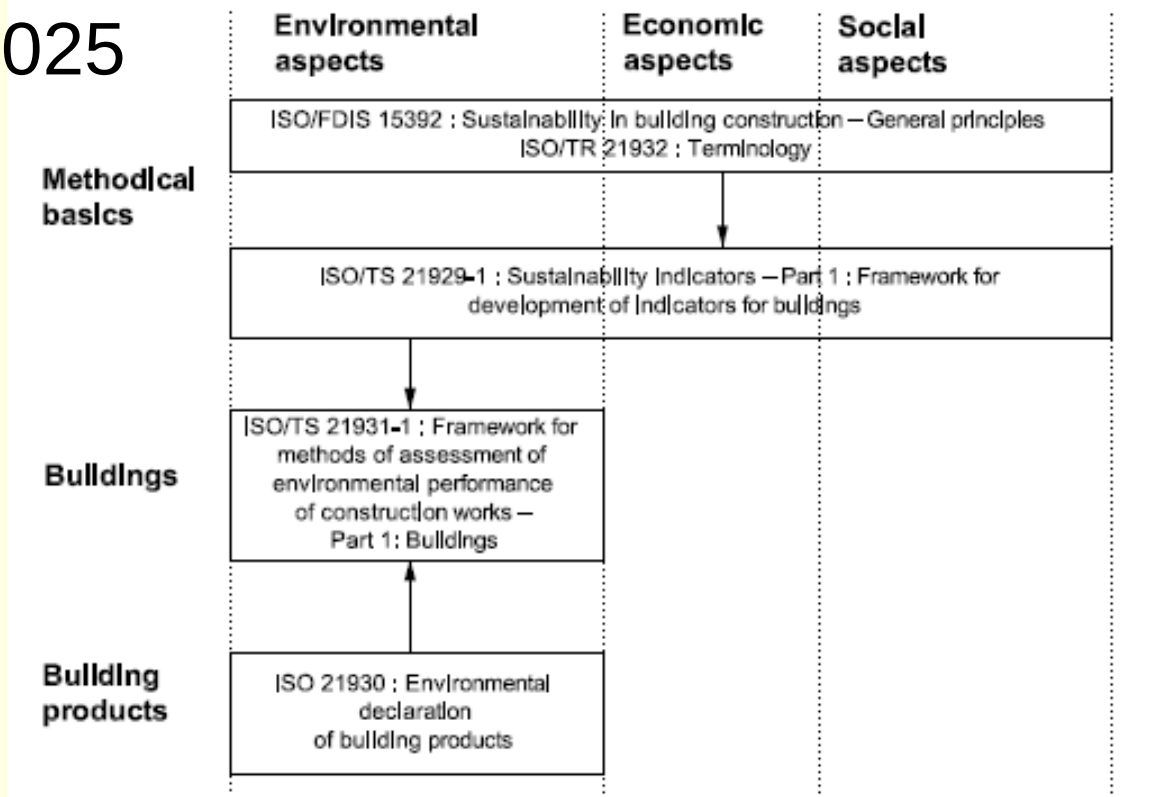
ISO 21930

- EPD for Building Products
- Provides PCR Framework
- Very similar to 14025
  - Introduces Reference Service of Building Products over life of Building
  - Cradle to gate information modules for B2B



ISO 21930 – Impact Categories

8.2.2.1 Environmental impacts expressed in terms of the impact categories of LCIA

- climate change (greenhouse gases);
- depletion of the stratospheric ozone layer;
- acidification of land and water sources;
- eutrophication;
- formation of tropospheric ozone (photochemical oxidants).

Essentially the same list as in ISO 14025

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Standardization of Sustainable Construction

- **ISO TC 59 SC 17**
  - ISO 15392: Sustainability in building construction – General principles
  - ISO TS 21929: Sustainability in building construction — Sustainability indicators — Part 1: Framework for the development of indicators for buildings
  - ISO 21930: Sustainability in building construction – Environmental declaration of products
  - ISO 21931: Sustainability in building construction -- Framework for methods of assessment for environmental performance of construction works -- Part 1: Building
- **ISO TC 59 SC 14**
  - ISO 15686: Buildings and constructed assets — Service life planning —
    - Part 1: General principles
    - Part 5 – Life cycle costing
    - Part 6: Procedures for considering environmental impacts
    - Part 8: Reference service life and service life estimation
- **CEN TC 350: Sustainability of construction works**
  - prCEN/TS 15643 1-4: Framework for assessment of integrated building performance – Part 1: Environmental, health and comfort and life cycle cost performances
  - WI 350002: Assessment of environmental performance of buildings — Calculation methods
  - WG2: Building Life Cycle Description
  - prEN 15804: Environmental product declarations — Product category rules
  - WI 350005: Environmental product declarations — Communication formats
  - WI 350006: Environmental product declarations — Methodology and data for generic data

A lot of activity to develop sustainable construction standards

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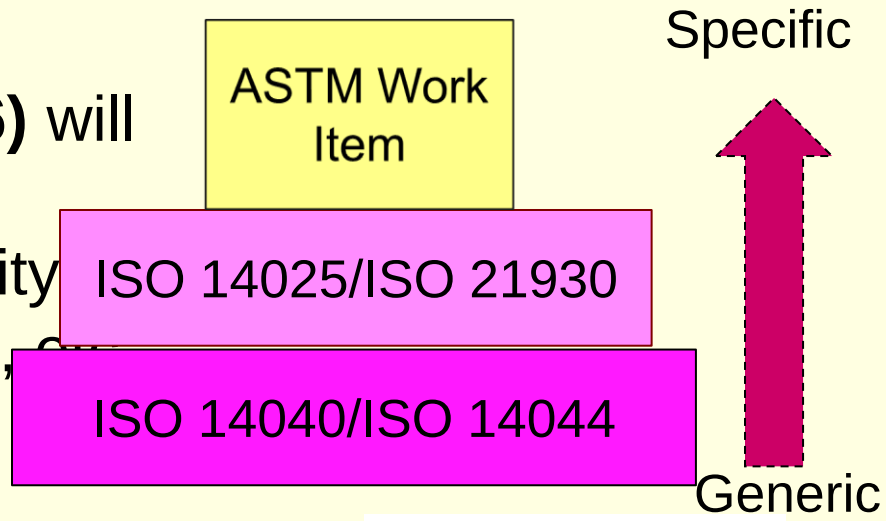
Standard Summary

- **ISO 14040 and 14044** set-up LCA calculation rules

- **ISO 14025 and 21930** describe procedures to develop Product Category Rules, for their open consultation, review, approval and publication

- **ISO I4025** for setting up the rules for independent verification

- **ASTM Standard (WK23566)** will complete these rules by providing specific data quality requirements, data sources, ...



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Competence of Verifiers

Program Operators establish minimum requirements for competence of verifiers

- Expertise in LCA and methodology for LCA
- Knowledge of sector
- Process and product knowledge
- Knowledge of relevant standards
- Knowledge of Type III requirements

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Independence of Verifiers and PCR Panel

Independent Verifiers (Internal or External):

- No involvement in the LCA or EPD
- No conflicts of interest

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Rules for data confidentially

Product-specific data are confidential because of

- Competitive business requirements
- Proprietary information covered by intellectual property rights
- Similar legal restrictions

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France

- Grenelle de l'Environnement Law (2007) – omnibus legislation
- All high volume consumer products sold in France have an EPD effective 1/1/11
- Anticipate that the program will spread to all of the EU
- Plastics Europe EPDs already available

Without EPDs, cannot sell to France: likely rest of EU will follow

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Technical Barriers to Trade

Safety & Environmental Laws & regulations based on International Standards are assumed not to be barriers to trade

Carbon Footprint Program in Japan

Sample of Carbon footprint

エコプロダクツ2008出展
カーボンフットプリント暫定表示

Provisional mark for
EcoProducts 2008 Exhibition

Enterprise	KOKUYO S&T Co.,Ltd.
Product of the carbon footprint	Pipe Type File, "EcoTwin-R", (7-RT650B),
Quantity	A4-size, Paper Capacity; 5cm

Stage	Material Production	Product Manufacturing	Transportation	Retailing	Usage	Disposition /Recycling	Total
GHG Emission g-CO_2/P	1003.8	27.3	50.9	155.9	0	99.5	1337
Calculation condition	-The GHG emission in Material Production Stage was calculated using design weight and secondary data prepared by the secretariat, where loss ratio of sheet type material was considered. -The GHG emission in Retailing Stage was calculated using given value of GHG per sales price, which was prepared by the secretariat. -The GHG emission in Usage Stage was identified as zero due to no energy consumption in this stage.						

Product Environmental Aspects Declaration
ECO LEAF
製品環境情報
http://www.jemai.or.jp

Walmart

- LCA is the basis of its sustainability program
- Using LCA in Packaging Program now
  - Data on every single package
- Planning EPD with a sustainability index for all products

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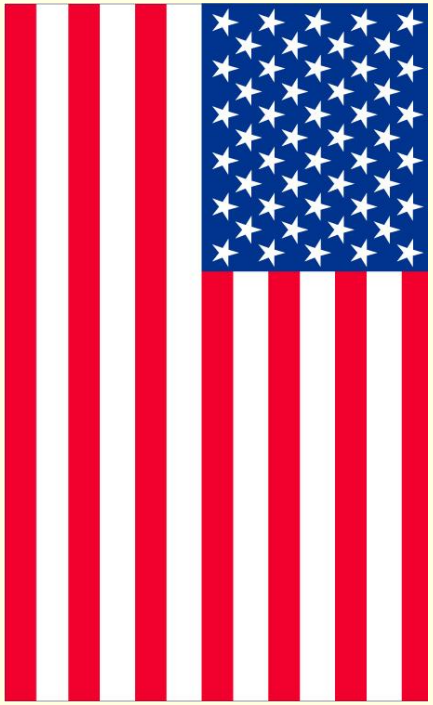
Carbon Footprinting Proposed in U.S. Legislation

- HR 3543 (carbon disclosure)
- HR 2454 (American Clean Energy and Security Act) – Passed
- Senate 1733 (Energy Bill) in committee



- *Bottom line: carbon footprinting is coming to the U.S.*

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Step towards PCRs in the U.S.

- Pilot Project to build infrastructure for PCRs
  - Invited Workshop, November 4-5, in Seattle
  - Jointly sponsored by EPA Region X and the Institute for Environmental Research and Education
- Goal to discuss and plan for an infrastructure for PCRs for building components.

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Interested Parties

Questions?